

## **Grade 4 Target H**

### **Domain, Target, Standards, DOK, Vertical Alignments, Achievement Levels, Evidence Required, Vocabulary, Response Types, Materials, Attributes, Question Types, and Question Banks (Examples)**

[Content Domain: Number and Operations—Fractions](#)

[Target H \[m\]: 4.NF.C Understand decimal notation for fractions, and compare decimal fractions.](#)

[Standards included in Target H: 4.NF.C.5, 4.NF.C.6, 4.NF.C.7](#)

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### **Content Domain: Number and Operations—Fractions**

#### **Target H [m]: 4.NF.C Understand decimal notation for fractions, and compare decimal fractions.**

#### **Standards included in Target H: 4.NF.C.5, 4.NF.C.6, 4.NF.C.7**

**4.NF.C** Understand decimal notation for fractions, and compare decimal fractions.

**4.NF.C.5** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express  $\frac{3}{10}$  as  $\frac{30}{100}$ , and add  $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$ .

**4.NF.C.6** Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as  $\frac{62}{100}$ ; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

**4.NF.C.7** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions, e.g., by using a visual model.

### **Vertical Alignment**

#### **Related Grade 3 standards**

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3.NF.A Develop understanding of fractions as numbers.

3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

- a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
- b. Recognize and generate simple equivalent fractions, e.g.,  $\frac{1}{2} = \frac{2}{4}$ ,  $\frac{4}{6} = \frac{2}{3}$ . Explain why the fractions are equivalent, e.g., by using a visual fraction model.
- c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form  $3 = \frac{3}{1}$ ; recognize that  $\frac{6}{1} = 6$ ; locate  $\frac{4}{4}$  and 1 at the same point of a number line diagram.
- d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions, e.g., by using a visual fraction model.

### **Related Grade 5 Standards**

5.NBT.A Understand the place value system.

5.NBT.A.3 Read, write, and compare decimals to thousandths.

- a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g.,  $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (\frac{1}{10}) + 9 \times (\frac{1}{100}) + 2 \times (\frac{1}{1000})$ .
- b. Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.

5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example,  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . (In general,  $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$ .)

### **Achievement Level Descriptors**

**Level 1** No Descriptor

**Level 2** Students should be able to express a fraction with denominator 10 as an equivalent fraction with denominator 100 and express those fractions as decimals.

**Level 3** Students should be able to add two fractions with respective denominators 10 and 100 by first converting to two fractions with like denominators; compare two decimals to the hundredths using  $>$ ,  $<$ ,  $=$ , or on a number line; and compare decimals by reasoning about their size.

**Level 4** Students should be able to compare two decimals to the hundredths using  $<$ ,  $>$ , and  $=$  and justify the conclusions by using visual models.

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### **Evidence Required**

1. The student expresses a fraction with denominator 10 as an equivalent fraction with denominator 100.
2. The student adds two fractions with respective denominators 10 and 100.
3. The student uses decimal notation to represent fractions with denominators 10 or 100.
4. The student locates decimal numbers to the hundredths place on a number line.
5. The student compares two decimals to the hundredths place by reasoning about their size, using the symbols  $<$ ,  $>$ , or  $=$ .

### **Vocabulary**

equivalent, equal, decimal, kilometers, meters, centimeters, kilograms, grams, liters, milliliters, length, mass, volume, number line, fraction, denominator, equation, expression

### **Response Types**

Matching Tables; Hot Spot; Equation/Numeric; Graphing

### **Materials**

$<$ ,  $>$ , and  $=$  symbols, fractions, decimals to the hundredths, decimal models, number lines, fraction addition problems

### **Attributes**

- Denominators are limited to 10 and 100. Decimals are limited to tenths and hundredths.
- Unless otherwise specified, improper fractions and mixed numbers do not receive special treatment.

### **Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks**

Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

#### **Claim 1 4.NF.C.5 DOK Level 1**

Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express  $\frac{3}{10}$  as  $\frac{30}{100}$ , and add  $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$ .

### **Evidence Required**

The student expresses a fraction with denominator 10 as an equivalent fraction with denominator 100.

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**Question Type 1:** The student is presented with an equation with an unknown numerator that sets a fraction with denominator 10 equal to a fraction with denominator 100.

1. Enter the unknown number that makes this equation true.

$$\frac{\square}{10} = \frac{40}{100}$$

2. Enter the unknown number that makes this equation true.

$$\frac{4}{10} = \frac{\square}{100}$$

Rubric: (1 point) The student determines an equivalent fraction and enters the correct number (e.g., 4; 40).

Response Type: Equation/Numeric

**Question Type 2:** The student is presented with an equation that sets a fraction with denominator 10 equal to a fraction with denominator 100.

Determine if each equation is true or false. Select True or False for each equation.

	True	False
$\frac{4}{10} = \frac{40}{100}$		
$\frac{5}{10} = \frac{50}{10}$		
$\frac{11}{10} = \frac{110}{100}$		

Rubric: (1 point) The student correctly identifies all three equations as true or false, showing understanding of equivalent fractions with denominators 10 or 100 (e.g., T, F, T).

Response Type: Matching Tables

**Claim 1 4.NF.C.5 DOK Level 2**

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Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express  $\frac{3}{10}$  as  $\frac{30}{100}$ , and add  $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$ .

### Evidence Required

The student adds two fractions with respective denominators 10 and 100.

**Question Type 1:** The student is presented with three fraction addition equations in the answer choices.

Determine if each equation is true or false. Select True or False for each equation.

	True	False
$\frac{5}{10} + \frac{18}{100} = \frac{68}{100}$		
$\frac{11}{10} + \frac{13}{100} = \frac{24}{100}$		
$\frac{10}{10} + \frac{45}{100} = \frac{145}{100}$		

Rubric: (1 point) The student shows the ability to add fractions with denominators 10 and 100 by correctly identifying all three equations as true or false (e.g., T, F, T).

Response Type: Matching Tables

**Question Type 2:** The student is presented with a fraction addition equation with an unknown number.

1, Enter the unknown numerator that makes this equation true.

$$\frac{6}{10} + \frac{3}{100} = \frac{\square}{100}$$

2. Enter the unknown number that makes this equation true.

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$$\frac{3}{10} + \frac{15}{100} = \square$$

Rubric: (1 point) The student finds the sum of fractions with denominators 10 or 100 and correctly enters the value of the unknown number (e.g., 63; 45/100). The student may also give a correct decimal equivalent to an unknown fraction (e.g., not possible for Example Stem 1 since the unknown is a numerator only; 0.45).

Response Type: Equation/Numeric

**Question Type 3:** The student is presented with a fraction addition equation with an unknown number.

1, Enter the unknown numerator that makes this equation true.

$$\frac{\square}{10} + \frac{15}{100} = \frac{65}{100}$$

2. Enter the unknown number that makes this equation true.

$$\frac{3}{10} + \square = \frac{65}{100}$$

Rubric: (1 point) The student finds the sum of fractions with denominators 10 or 100 and correctly enters the value of the unknown number (e.g., 5; 35/100). The student may also give a correct decimal equivalent to an unknown fraction (e.g., not possible for Example Stem 1 since the unknown is a numerator only; 0.35).

Response Type: Equation/Numeric

### Claim 1 4.NF.C.6 DOK Level 1

Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

### Evidence Required

The student uses decimal notation to represent fractions with denominators 10 or 100.

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**Question Type 1:** The student is presented with a fraction with denominator 10 or 100.

Enter a decimal that is equivalent to  $\frac{31}{10}$ .

Rubric: (1 point) The student determines an equivalent decimal representation of the given fraction and enters the correct decimal (e.g., 0.3).

Response Type: Equation/Numeric

**Question Type 2:** The student is presented with three equations that set fractions with denominators of 10 or 100 equal to decimals, in the answer choices.

Determine if each equation is true or false. Select True or False for each equation.

	True	False
$\frac{85}{100} = 85.100$		
$\frac{20}{100} = 0.2$		
$\frac{14}{100} = 0.014$		

Rubric: (1 point) The student correctly identifies all three equations as true or false, showing the ability to translate between decimal and fraction representations (e.g., F, T, F).

Response Type: Matching Tables

#### **Claim 1 4.NF.C.6 DOK Level 1**

Use decimal notation for fractions with denominators 10 or 100. For example, rewrite  $\frac{62}{100}$  as 0.62; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

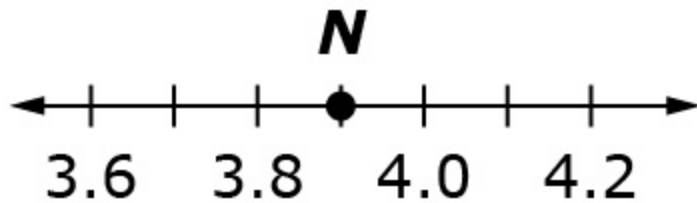
#### **Evidence Required**

The student locates decimal numbers to the hundredths place on a number line.

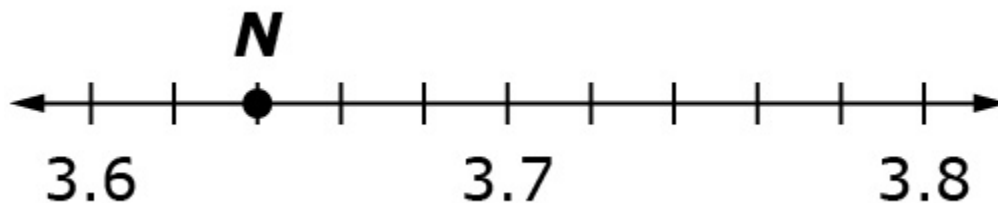
**Question Type 1:** The student is presented with a number line with a point marked on a tick mark or between two tick marks and labeled with a variable.

1. Enter the decimal value of the unknown number located at point N.

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2. Enter the decimal value of the unknown number located at point N.

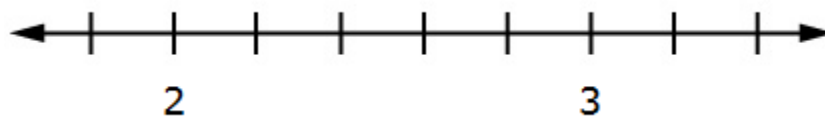


Rubric: (1 point) The student locates a decimal number on a number line and enters the correct value of the variable (e.g., 3.9; 3.64).

Response Type: Equation/Numeric

**Question Type 2:** The student is presented with a number line and a number whose value is located at a tick mark or between two tick marks on the number line.

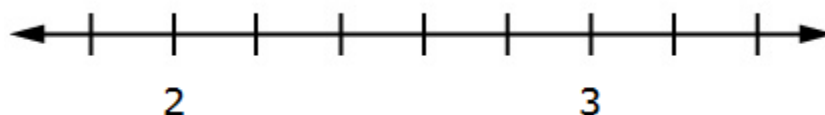
1. Use the Add Point tool to put a point on the number line to show the location of 2.2.



Rubric: (1 point) The student locates a decimal number on a number line and places the point on the correct tick mark (e.g., student places the point at 2.2).

Response Type: Graphing

2. Use the Add Point tool to put a point on the number line to show the location of 2.32.



Rubric: (1 point) The student locates a decimal number on a number line and places the point within a range equal to 10% of the interval above or below the correct spot, without placing the

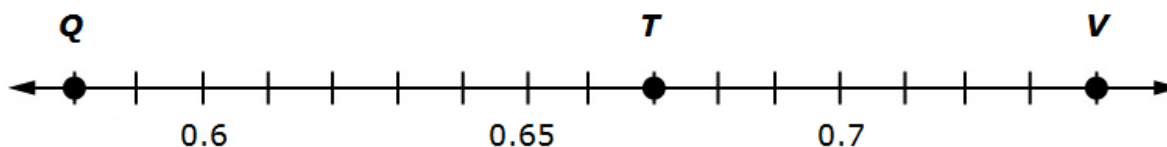


point on or beyond the nearest tick mark (e.g., student places the point in the range of 2.30 – 2.34).

Response Type: Graphing

**Question Type 3:** The student is presented with a number line which includes two labeled points.

Use this number line to identify the numbers that each letter represents.



Enter the numbers represented by Q and T in the response boxes.

Rubric: (1 point) The student shows an understanding of decimal number lines by correctly identifying the value of both letters on the number line (e.g., 0.58 and 0.67).

Response Type: Equation/Numeric (2 labeled response boxes)

**Claim 1 4.NF.C.7 DOK Level 2**

Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions, e.g., by using a visual model.

**Evidence Required**

The student compares two decimals to the hundredths place by reasoning about their size, using the symbols  $<$ ,  $>$ , or  $=$ .

The student is presented with two pairs of decimal numbers, up to the hundredths place and directed to compare them using ( $<$ ,  $>$ , or  $=$ ).

Select the symbol ( $<$ ,  $>$ , or  $=$ ) that correctly compares each pair of numbers.

	$<$	$>$	$=$
$0.09 \square 0.7$			
$1.2 \square 0.37$			

Rubric: (1 point) The student identifies the correct symbol to compare pairs of decimals (e.g.,  $<$ ,  $>$ ).

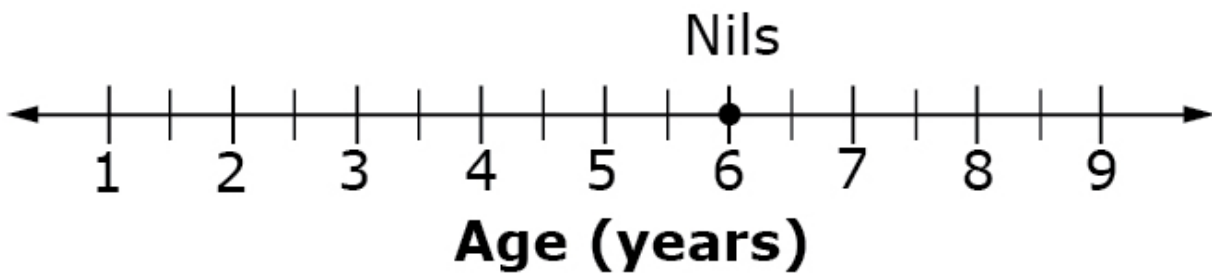
Response Type: Matching Table

**Claim 2 Problem Solving Questions Banks**  
[Claim Descriptors and Targets](#)

Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.

**Example 1**

Hank is 8.5 years old. Nils' age in years is plotted on the number line shown.



How many years older is Hank than Nils?

Enter the number of years in the response box.

Rubric: (1 point) The student enters the correct age difference (2.5 or  $2\frac{1}{2}$ ).

Response Type: Equation/numeric